Claims

1. Two-component polyurethane composition consisting of a first component **A** comprising

   at least one polyurethane prepolymer **A1** with isocyanate end groups, synthesized from at least one polyisocyanate and at least one polyol

   and a second component **B** comprising

   water

   as well as at least one polyaldimine **B1**, which can be obtained from at least one polyamine **PA** with aliphatic primary amino groups and at least one low-odor aldehyde **ALD** as in formula (I) or formula (II),

(I)

(II)

where Y^1 and Y^2

either

each independently represent on the one hand a hydrogen atom, a hydroxyl group, or an organic residue;

or

together represent a carbocyclic or heterocyclic ring, having a ring size between 5 and 8 atoms, preferably 6 atoms;

and Y^3

either

stands for a substituted or unsubstituted alkyl group having at least one hetero atom;

or

stands for a branched or unbranched alkyl or alkylene group with at least 10 C atoms;

or

stands for a substituted or unsubstituted aryl or arylalkyl group;

or

stands for O—R^1 or $O\text{-}\overset{O}{\overset{\|}{C}}\text{-}R^1$ or $\overset{O}{\overset{\|}{C}}\text{-}O\text{-}R^1$ or $\overset{O}{\overset{\|}{C}}\text{-}R^1$, wherein R^1 stands for an aryl, arylalkyl, or alkyl group with at least 3 C atoms and in each case is substituted or unsubstituted;

and Y^4

either

stands for a substituted or unsubstituted aryl or heteroaryl group, having a ring size between 5 and 8 atoms, preferably 6 atoms;

or

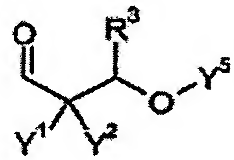
or stands for $\overset{O}{\overset{\|}{C}}\text{-}R^2$, with R^2 = alkyl, hydroxyl, or alkoxy;

or

stands for a substituted or unsubstituted alkenyl or arylalkenyl group with at least 6 C atoms.

2. Two-component polyurethane composition as in Claim 1, characterized in that the heteroatom in Y^3 is present in the form of an ether oxygen or a carboxyl, ester, or hydroxyl group.

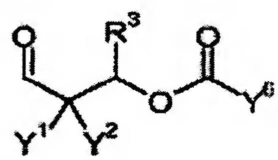
3. Two-component polyurethane composition as in Claim 1 or Claim 2, characterized in that the aldehyde **ALD** has formula (III),



(III)

where R^3 and Y^5 each independently stand for a hydrogen atom or for an alkyl or arylalkyl group.

4. Two-component polyurethane composition as in Claim 1 or Claim 2, characterized in that the aldehyde **ALD** has formula (IV),



(IV)

wherein
R^3 stands for a hydrogen atom or for an alkyl or arylalkyl group, and Y^6
either
represents a hydrogen atom;
or
represents an alkyl or arylalkyl or aryl group, which optionally has at least one hetero atom, optionally contains at least one carboxyl group, and optionally contains at least one ester group;
or
or represents a monounsaturated or polyunsaturated, linear or branched hydrocarbon chain.

5. Two-component polyurethane composition as in Claim 4, characterized in that R^3 stands for a hydrogen atom, and

Y^6

either

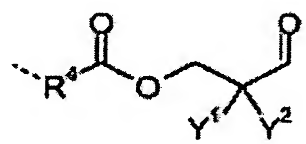
stands for a linear or branched alkyl chain with 11 to 30 carbon atoms, optionally with at least one hetero atom, in particular with at least one ether oxygen;

or

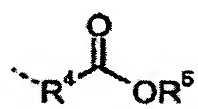
stands for a monounsaturated or polyunsaturated linear or branched hydrocarbon chain with 11 to 30 carbon atoms;

or

stands for a residue of formula (V) or (VI),



(V)



(VI)

wherein

R^4 either

stands for a linear or branched or cyclic alkylene chain with 2 to 16 carbon atoms, optionally with at least one hetero atom, in particular with at least one ether oxygen;

or

stands for a monounsaturated or polyunsaturated, linear or branched or cyclic hydrocarbon chain with 2 to 16 carbon atoms;

and

R^5 stands for a linear or branched alkyl chain with 1 to 8 carbon atoms.

6. Two-component polyurethane composition as in any one of Claims 4 or 5, characterized in that the aldehyde **ALD** used to synthesize the polyaldimine can be obtained by means of an esterification reaction between a β-hydroxyaldehyde and a carboxylic acid, in particular without use of a solvent, where the β-hydroxyaldehyde is synthesized, optionally *in situ*, from formaldehyde or paraformaldehyde and a second aldehyde.

7. Two-component polyurethane composition as in Claim 6, characterized in that the aldehyde **ALD** used to synthesize the polyaldimine can be obtained by means of an esterification reaction between 3-hydroxypivalaldehyde and a carboxylic acid, in particular without use of a solvent, where the 3-hydroxypivalaldehyde is synthesized, optionally *in situ*, from formaldehyde or paraformaldehyde and isobutyraldehyde.

8. Two-component polyurethane composition as in Claim 6 or Claim 7, characterized in that the carboxylic acid used to synthesize the aldehyde **ALD** is selected from the group including lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, linolenic acid, succinic acid, adipic acid, azelaic acid, and sebacic acid, mixtures thereof, and their industrial mixtures with fatty acids.

9. Two-component polyurethane composition as in any of the preceding claims, characterized in that $Y^1 = Y^2$ = methyl.

10. Two-component polyurethane composition as in Claim 1 or Claim 2, characterized in that the aldehyde **ALD** has formula (I) and Y^1 stands for a hydroxyl group, Y^2 stands for a hydrogen atom,

and Y^3 stands for an alkyl group with at least one hydroxyl group, in particular with more than one hydroxyl group.

11. Two-component polyurethane composition as in any one of the preceding claims, characterized in that the polyamine **PA** with aliphatic primary amino groups is selected from the group consisting of 1,6-hexamethylenediamine, MPMD, DAMP, 2,2,4- and 2,4,4-trimethylhexamethylenediamine, 4-aminomethyl-1,8-octanediamine, IPDA, 1,3- and 1,4-xylylenediamine, 1,3- and 1,4-bis(aminomethyl)cyclohexane, bis(4-aminocyclohexyl)methane, bis(4-amino-3-methylcyclohexyl)methane, 3(4),8(9)-bis(aminomethyl)tricyclo[5.2.1.$0^{2,6}$]decane, 1,2-, 1,3- and 1,4-diaminocyclohexane, 1,4-diamino-2,2,6-trimethylcyclohexane, polyoxyalkylene polyamines with theoretically two or three amino groups, in particular Jeffamine® EDR-148, Jeffamine® D-230, Jeffamine® D-400 and Jeffamine® T-403, as well as mixtures of two or more of the aforementioned polyamines.

12. Two-component polyurethane composition as in any one of the preceding claims, characterized in that for synthesis of the polyaldimine **B1**, the aldehyde **ALD** is used in stoichiometric proportion or in stoichiometric excess relative to the primary amino groups of the polyamine **PA**.

13. Two-component polyurethane composition as in any of the preceding claims, characterized in that the water in the second component **B** is present in free form or is reversibly bound to a carrier.

14. Two-component polyurethane composition as in any one of the preceding claims, characterized in that the second component **B** has at least one water molecule per aldimine group.

15. Two-component polyurethane composition as in any one of the preceding claims, characterized in that the polyol for synthesis of the polyurethane prepolymer **A1** of the first component **A** has an average number of OH groups equal to 1.6 to 3.

16. Two-component polyurethane composition as in Claim 15, characterized in that the polyol is a polyoxyalkylene polyol, in particular a polyoxyalkylene diol or triol, in particular a polyoxypropylene diol or triol or an EO-endcapped polyoxypropylene diol or triol.

17. Two-component polyurethane composition as in Claim 15 or Claim 16, characterized in that the polyol is a polyoxyalkylene polyol with a degree of unsaturation < 0.02 meq/g and a molecular weight M_n from 1000 to 30 000 g/mol.

18. Two-component polyurethane composition as in Claim 17, characterized in that the polyol is a polyol synthesized by means of DMC catalysis.

19. Two-component polyurethane composition as in any one of the preceding claims, characterized in that the polyurethane prepolymer **A1** in the first component **A** and the polyaldimine **B1** in the second component **B** are present in a ratio from 0.1 to 0.99, in particular from 0.4 to 0.8 equivalents of aldimine groups per equivalent of isocyanate groups.

20. Method for mixing a two-component polyurethane composition as in any one of Claims 1 to 19, characterized in that the first component **A** and the second component **B** are blended by essentially uniform mixing.

21. Method for mixing a two-component polyurethane composition as in any one of Claims 1 to 19, characterized in that the first component **A** and the second component **B** are blended by essentially laminar mixing.

22. Method for mixing as in Claim 20 or Claim 21, characterized in that the mixing of the two components **A** and **B** is carried out by means of a dispensing attachment containing two interlocking dispensing rotors, as well as in addition optionally by means of a static mixer mounted at the outlet of this dispensing attachment.

23. Method for application of a two-component polyurethane composition as in any one of Claims 1 to 19, characterized in that it includes the following steps:
   - Mixing of the two components **A** and **B**
   - Making contact between at least one solid surface and the mixed polyurethane composition
   - Curing the mixed polyurethane composition.

24. Method for application as in Claim 23, characterized in that the contact with the solid surface is made by applying a bead to the surface.

25. Use of a two-component polyurethane composition as in any one of Claims 1 to 19 as an adhesive, sealant, or surfacing, in particular as an adhesive or sealant.

26. Article which is tightly bonded with a mixed and cured two-component polyurethane composition as in any one of Claims 1 to 19.